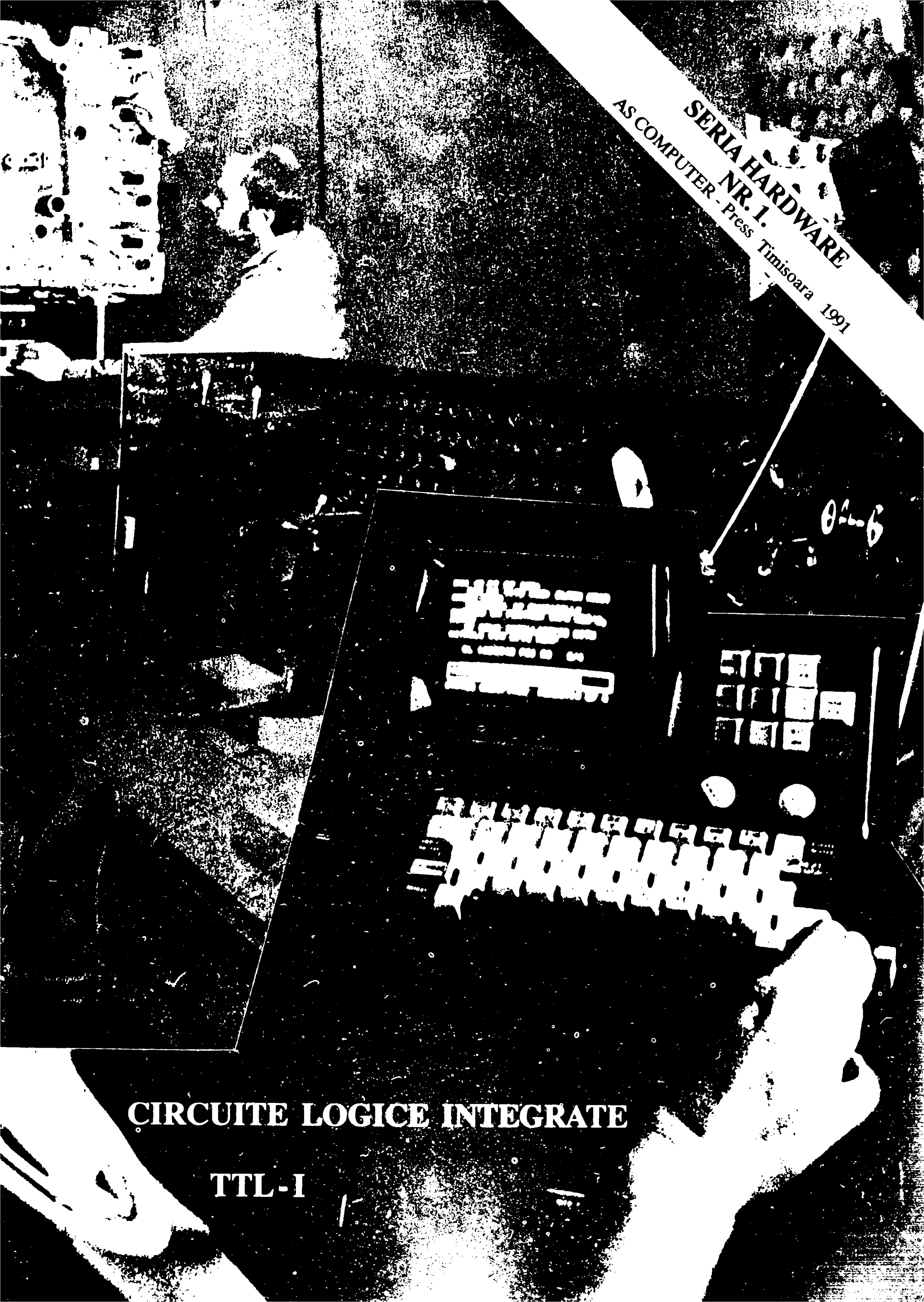


SERIA HARDWARE
NR. 1.
AS COMPUTER - Press Timisoara 1991

# CIRCUITE LOGICE INTEGRATE

## TTL - I

# PREFAȚĂ

Materialul de față își propune să vină în întîmpinarea numeroșilor utilizatori de circuite integrate TTL, CMOS sau ECL. În acest sens s-a considerat deosebit de utilă prezentarea, sub formă condensată, a unui catalog de astfel de circuite integrate, care să conțină informațiile esențiale pentru activitatea curentă a unui utilizator de circuite integrate numerice.

Selecția principalilor parametrii s-a făcut pe baza unei bogate experiențe didactice și practice, considerîndu-se că pentru marea majoritate a aplicațiilor un catalog condensat satisface cerințele utilizatorilor.

Pentru întocmirea catalogului condensat s-au studiat un număr important de cataloage și date tehnice furnizate de principalele firme producătoare de circuite integrate. S-a încercat totodată, o prezentare a acestui compendiu de circuite integrate într-un mod cît mai unitar, fără a neglija unele particularități specifice anumitor tipuri de circuite integrate numerice.

Catalogul condensat care urmează a fi prezentat în mai multe fascicole, v-a conține toată gama de circuite integrate numerice din cadrul familiilor TTL, CMOS și ECL, existente în prezent pe piața mondială.

În primul fascicol se vor prezenta pe scurt modul de definire a parametrilor circuitelor integrate cît și primele 100 de tipuri de circuite integrate TTL.

În următoarele se va continua cu prezentarea următoarelor 700 de tipuri de circuite integrate TTL, intenționînd ca să intercalăm și unele aspecte specifice acestei familii de circuite integrate, astfel încît utilizatorul să aibă o viziune cît mai completă asupra avantajelor și eventualelor dezavantaje pe care le implică realizarea unor sisteme numerice folosind astfel de circuite.

În mod asemănător ne propunem abordarea și celorlalte două familii de circuite integrate CMOS și ECL.

Seria prezentărilor celor mai importante circuite integrate numerice se dorește să se termine cu o selecție de aplicații utile.

Coordonator
Mircea STRATULAT

grafica Popa'S

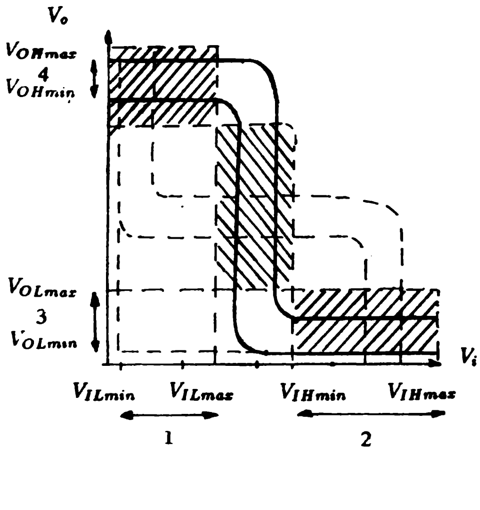
# 1.Parametrii circuitelor logice integrate (CLI)

Parametrii circuitelor logice integrate precizeaza regulile de interconectare si caracterizeaza performantele pe care le prezinta acestea.
In functie de schema electronica si aparitia cronologica C L I se impart in familii de circuite integrate. Circuitele dintr-o familie prezinta aceleasi nivele logice si sint caracterizate prin parametrii definiti identici.
La rindul lor o familie de CLI poate fi clasificata in "serii de CLI". Fiecare serie se remarca prin performante sporite a unui parametru; fiind denumita dupa parametrul respectiv.
Din punct de vedere electric un CLI se caracterizeaza prin urmatorii parametrii: tensiunea de alimentare, nivele logice de tensiune, puterea consumata, viteza, protectia contra zgomotelor, curentii de intrare si iesire, parametrii ce caracterizeaza regulile de interconectare.

## 1.1. Caracteristica statica de transfer

Caracteristica statica de transfer a unui CLI reprezinta variatia tensiunii de iesire functie de tensiunea de intrare. Datorita variatiei tensiunii de alimentare, a parametrilor componentelor semiconductoare si temperaturilor de lucru diferite, pentru o familie de CLI sint valabile caracteristici limita de transfer (fig.1). Pe baza caracteristicilor din fig.1 se pot defini variabilele logice.

Astfel fiecare variabila logica se asociaza la doua plaje de tensiune : plaja tensiunilor garantate la iesire si plaja tensiunilor admise la intrare.Un CLI functioneaza corect, din punct de vedere logic, daca toate tensiunile de intrare sint plasate in una din plajele admise, ceea ce determina ca tensiunea de iesire sa se gaseasca in plaja garantata corespunzatoare tensiunii de iesire. Cele patru plaje de tensiune sint delimitate de opt tensiuni limita:



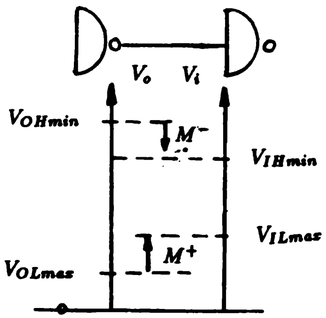

1.Plaja admisa la intrare pentru "0" logic
ViLmax-ViLmin
2.Plaja admisa la intrare pentru "1" logic
ViHmax-ViHmin
3.Plaja garantata la iesire pentru "0" logic
V0Lmax-ViLmin
3.Plaja garantata la iesire pentru "1" logic
V0Hmax-ViHmin

Fig. 1

## 1.2. Marginea de protectie contra perturbatiilor

Marginea de protectie contra semnalelor perturbatoare, numita si imunitate la zgomot a unui CLI, este egala cu valoarea maxima pe care o poate lua tensiunea perturbatoare la intrarea circuitului, astfel ca la iesirea acestuia sa se mentina nivelul de tensiune in cadrul plajei garantate. Intr-un sistem numeric fiecare circuit este actionat de alt circuit si la rindul lui comanda un circuit.

Definirea marginii de zgomot se face ca in fig.2.

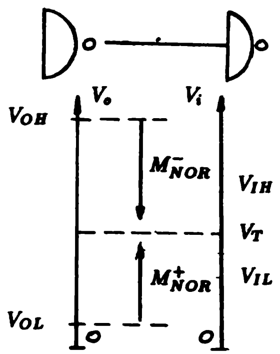



$M^+ = V_{iLmax} - V_{0Lmax}$

$M^- = V_{0Hmin} - V_{iHmin}$

Fig. 2

Marimile definite mai sus prezinta valori minime. Daca se apreciaza ca sistemul numeric, ce utilizeaza CLI nu lucreaza in conditii deosebit de defavorabile atunci se poate defini o margine de zgomot normala (fig.3).




$M^+_{NOR} = V_T - V_{0L}$
$M^-_{NOR} = V_{0H} - V_T$

unde $V_T$ reprezinta tensiunea de prag

Fig. 3

## 1.3. Factorul de incarcare

Acest parametru defineste regulile de interconectare ale circuitelor din cadrul sistemului numeric.
Pentru definirea factorului de incarcare se considera in mod conventional ca o poarta logica constituie sarcina unitara; definind factorul de incarcare la intrare pentru cele doua nivele logice: $FI_L = 1$; $FI_H = 1$
Considerind ca un circuit logic va comanda alte N circuite identice va rezulta o definire pentru factorul de incarcare la iesire in cele doua situatii

$$FE_H = \left|\frac{I_{OH}}{I_{iH}}\right| \qquad FE_L = \left|\frac{I_{OL}}{I_{iL}}\right|$$

Se poate constata ca cei patru factori de incarcare sint numere intregi pozitive.
Se precizeaza ca toti curentii de intrare/iesire au semnale pozitive daca sint absorbiti de CLI (spre circuit) in caz contrar se atribuie,in mod conventional, semnul negativ.
Daca circuitele logice interconectate prezinta curenti de intrare/iesire diferiti se impune respectarea urmatoarelor relatii: $I_{OH} = \Sigma I_{iH}$ ; $I_{OL} = \Sigma I_{iL}$

## 1.4. Puterea consumata

Acest parametru defineste puterea absorbita de CLI de la sursa de alimentare.
Parametrul are trei componente:
Puterea consumata in regim static :

$$P_{cc} = \frac{I_{CCH} + I_{CCL}}{2} V_{cc}$$

unde curentii $I_{CC}$ sint curenti absorbiti de la sursa de alimentare in regim static atunci cind la iesire este "1" respectiv "0" logic.
Puterea consumata in regim dinamic :

$$P_{d1} = V_{cc}^2 \, C_p . f$$

unde:
$V_{cc}$ - tensiunea de alimentare.
$C_p$ - capacitatile parazite de la iesirea CLI.
f - frecventa de lucru a CLI.

$P_{d2}$ - puterea dinamica datorata supracurentilor rezultati in urma comutarii si care depind de schema interna a CLI.

## 1.5. Viteza de comutare

Este parametrul ce specifica frecventa maxima de lucru a CLI cit si timpul de raspuns al acestuia din momentul aplicarii semnalului de intrare. Timpul de raspuns al CLI poarta denumirea de timp de propagare si este definit ca in fig.4

$$t_{pd} = \frac{t_{pHL} + t_{pLH}}{2}$$

unde tpd - timpul de propagare mediu.

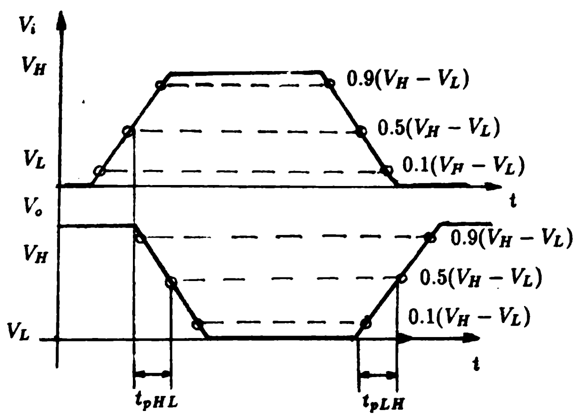



Fig. 4

## 1.6. Factorul de calitate

Constitue produsul dintre puterea statica si timpul de propagare mediu.

## 7400 QUADRUPLE 2-INPUT NAND GATES

$V_{cc} = 5V$ PATRU PORTI SI-NU CU 2 INTRARI

Y = [illegible]

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 16 | 0,8 | 1,6 | 40 | 10 | 10 | 11 | 7 | 4 | 12 |
| LS00 | 8 | 0,4 | 0,4 | 20 | 2 | 9,5 | 9 | 10 | 0,8 | 2,4 |
| S00 | 20 | 1 | 2 | 50 | 19 | 3 | 3 | 3 | 10 | 20 |
| ALS00 | 8 | 0,4 | 0,2 | 20 | 1,3 | 4,5 | 4 | 5 | 0,43 | 1,62 |
| L00 | 3,6 | 0,2 | 0,18 | 10 | 1 | 33 | 35 | 31 | 0,44 | 1,16 |
| H00 | 20 | 1 | 2 | 50 | 22 | 6 | 5,9 | 6,2 | 10 | 26 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7401 QUADRUPLE 2-INPUT NAND GATES WITH OPEN COLLECTORS OUTPUTS

$V_{cc} = 5V$ PATRU PORTI SI-NU CU 2 INTRARI CU COLECTOR IN GOL

Y = [illegible]

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 16 | 250 | 1,6 | 40 | 10 | 22 | 35 | 8 | 4 | 12 |
| H01 | 20 | 250 | 2 | 50 | 20,5 | 9 | 10 | 7,5 | 10 | 26 |
| L01 | 3,6 | 50 | 0,18 | 10 | 1 | 47 | 60 | 33 | 0,44 | 1,16 |
| LS01 | 8 | 100 | 0,4 | 20 | 2 | 16 | 17 | 15 | 0,8 | 2,4 |
| ALS01 | 8 | 100 | 0,2 | 20 | 1,3 | 16 | 20 | 12 | 0,43 | 1,62 |

| | | | |
|---|---|---|---|
| 1Y | 1 | 14 | Vcc |
| 1A | 2 | 13 | 4Y |
| 1B | 3 | 12 | 4B |
| 2Y | 4 | 11 | 4A |
| 2A | 5 | 10 | 3Y |
| 2B | 6 | 9 | 3B |
| GND | 7 | 8 | 3A |

## 7402 QUADRUPLE 2-INPUT NOR GATES

$V_{cc} = 5V$ PATRU PORTI SAU-NU CU 2 INTRARI

Y = [illegible]

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | ICCL mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 02 | 16 | 0,4 | 1,6 | 40 | 14 | 10 | 12 | 8 | 8 | 14 |
| L02 | 3,6 | 0,1 | 0,18 | 10 | 1,4 | 33 | 31 | 35 | 0,8 | 1,4 |
| LS02 | 8 | 0,4 | 0,4 | 20 | 2,8 | 10 | 10 | 10 | 1,6 | 2,8 |
| S02 | 20 | 1 | 2 | 50 | 29 | 3,5 | 3,5 | 3,5 | 17 | 26,26 |
| ALS02 | 8 | 0,4 | 0,4 | 20 | 1,9 | 5,5 | 6 | 5 | 0,86 | 2,16 |

| | | | |
|---|---|---|---|
| 1Y | 1 | 14 | Vcc |
| 1A | 2 | 13 | 4Y |
| 1B | 3 | 12 | 4B |
| 2Y | 4 | 11 | 4A |
| 2A | 5 | 10 | 3Y |
| 2B | 6 | 9 | 3B |
| GND | 7 | 8 | 3A |

## 7403 QUADRUPLE 2-INPUT NAND GATES WITH OPEN COLLECTOR OUTPUTS

Vcc = 5V PATRU PORTI SI-NU CU 2 INTRARI CU COLECTOR IN GOL

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 03 | 16 | 250 | 1,6 | 40 | 10 | 22 | 35 | 8 | 4 | 12 |
| LS03 | 8 | 100 | 0,4 | 20 | 2 | 16 | 17 | 15 | 0,8 | 2,4 |
| S03 | 20 | 250 | 2 | 50 | 17,5 | 5 | 5 | 4,5 | 6 | 20 |
| ALS03 | 8 | 100 | 0,2 | 20 | 1,25 | 16 | 20 | 12 | 0,43 | 1,63 |
| L03 | 3,6 | 50 | 0,18 | 10 | 1 | 46 | 60 | 33 | 0,44 | 1,16 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7404 HEX INVERTERS

Vcc = 5V SASE INVERTOARE

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 04 | 16 | 0,4 | 1,6 | 40 | 10 | 10 | 12 | 8 | 6 | 18 |
| LS04 | 8 | 0,4 | 0,4 | 20 | 2 | 9,5 | 9 | 10 | 1,2 | 3,6 |
| S04 | 20 | 1 | 2 | 50 | 19 | 3 | 3 | 3 | 15 | 30 |
| ALS04 | 8 | 0,4 | 0,2 | 20 | 1,25 | 3,5 | 3,5 | 3,5 | 0,65 | 2,4 |
| H04 | 20 | 1 | 2 | 50 | 22 | 6 | 6 | 6,5 | 16 | 40 |
| L04 | 3,6 | 0,2 | 0,18 | 10 | 1 | 33 | 35 | 31 | 0,66 | 1,74 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1Y | 2 | 13 | 6A |
| 2A | 3 | 12 | 6Y |
| 2Y | 4 | 11 | 5A |
| 3A | 5 | 10 | 5Y |
| 3Y | 6 | 9 | 4A |
| GND | 7 | 8 | 4Y |

## 7405 HEX INVERTERS WITH OPEN COLLECTOR OUTPUTS

Vcc = 5V SASE INVERTOARE CU COLECTOR IN GOL

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCL}$ mA | $I_{CCH}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 05 | 16 | 250 | 1,6 | 40 | 10 | 24 | 40 | 8 | 6 | 18 |
| LS05 | 8 | 100 | 0,4 | 20 | 2 | 16 | 17 | 15 | 1,2 | 3,6 |
| S05 | 20 | 250 | 2 | 50 | 17,5 | 5 | 5 | 4,5 | 9 | 30 |
| ALS05 | 8 | 100 | 0,2 | 20 | 1,25 | 14 | 20 | 7 | 0,65 | 2,4 |
| H05 | 20 | 250 | 2 | 50 | 23,4 | 9 | 10 | 7,5 | 16 | 40 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1Y | 2 | 13 | 6A |
| 2A | 3 | 12 | 6Y |
| 2Y | 4 | 11 | 5A |
| 3A | 5 | 10 | 5Y |
| 3Y | 6 | 9 | 4A |
| GND | 7 | 8 | 4Y |

**7406** HEX INVERTERS BUFFERS/DRIVERS WITH OPEN COLLECTOR HIGH-VOLTAGE OUTPU'

Vcc = 5V 6 INVERTOARE CU COLECTOR IN GOL DE TENSIUNE RIDICATA

$Y = \overline{A}$ ; V0H = 30V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 06 | 40 | 250 | 1,6 | 40 | 26 | 12,5 | 10 | 15 | 30 | 32 |

IDENTIC CU 7405

**7407** HEX BUFFERS/DRIVERS WITH OPEN COLLECTOR HIGH-VOLTAGE OUTPUTS

Vcc = 5V 6 CIRCUITE DE COMANDA CU COLECTOR IN GOL SI DE TENSIUNE RIDICATA

Y = A ; V0H = 30V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 07 | 40 | 250 | 1,6 | 40 | 21 | 13 | 6 | 20 | 29 | 21 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1Y | 2 | 13 | 6A |
| 2A | 3 | 12 | 6Y |
| 2Y | 4 | 11 | 5A |
| 3A | 5 | 10 | 5Y |
| 3Y | 6 | 9 | 4A |
| GND | 7 | 8 | 4Y |

**7408** QUADRUPLE 2-INPUT AND GATES

Vcc = 5V PATRU PORTI SI CU 2 INTRARI

Y = A.B

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 08 | 16 | 0,8 | 1,6 | 40 | 19 | 15 | 17,5 | 12 | 11 | 20 |
| LS08 | 8 | 0,4 | 0,4 | 20 | 4,3 | 12 | 8 | 10 | 2,4 | 4,4 |
| S08 | 20 | 1 | 2 | 50 | 32 | 4,8 | 4,5 | 5 | 18 | 32 |
| ALS08 | 8 | 0,4 | 0,2 | 20 | 2,2 | 6,5 | 8 | 5 | 1,3 | 2,2 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 11 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

**7409** QUADRUPLE 2-INPUT AND GATES WITH OPEN COLLECTOR

Vcc = 5V PATRU PORTI SI CU 2 INTRARI SI COLECTOR IN GOL

Y = A.B ; V0H = 5V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 09 | 16 | 250 | 1,6 | 40 | 19,5 | 18,5 | 21 | 16 | 11 | 20 |
| LS09 | 8 | 100 | 0,4 | 20 | 4,3 | 18,5 | 20 | 17 | 2,4 | 4,4 |
| S09 | 20 | 250 | 2 | 50 | 32 | 6 | 5,5 | 6 | 18 | 32 |
| ALS09 | 8 | 100 | 0,2 | 20 | 2,2 | 15 | 20 | 10 | 1,35 | 2,2 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7410 TRIPLE 3-INPUT-NAND GATES

$V_{cc} = 5V$ TREI CIRCUITE SI-NU CU 3 INTRARI

$Y = \overline{A.B.C}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 16 | 0,4 | 1,6 | 40 | 10 | 10 | 11 | 7 | 3 | 9 |
| H10 | 20 | 0,5 | 2 | 50 | 22,5 | 6 | 5,9 | 6,3 | 7,5 | 19,5 |
| L10 | 3,6 | 0,2 | 0,18 | 10 | 1 | 33 | 35 | 31 | 0,33 | 0,87 |
| LS10 | 8 | 0,4 | 0,4 | 20 | 2 | 9,5 | 9 | 10 | 0,6 | 1,8 |
| S10 | 20 | 1 | 2 | 50 | 19 | 3 | 3 | 3 | 7,5 | 1,5 |
| ALS10 | 8 | 0,4 | 0,2 | 20 | 1,25 | 7 | 4 | 10 | 0,32 | 1,2 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1C |
| 2A | 3 | 12 | 1Y |
| 2B | 4 | 11 | 3C |
| 2C | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7411 TRIPLE 3-INPUT-AND GATES

$V_{cc} = 5V$ TREI PORTI SI CU 3 INTRARI

$Y = A.B.C$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| H11 | 20 | 0,5 | 2 | 50 | 40 | 8,2 | 7,6 | 8,8 | 18 | 30 |
| LS11 | 8 | 0,4 | 0,4 | 20 | 4,3 | 9 | 8 | 10 | 1,8 | 3,3 |
| S11 | 20 | 1 | 2 | 50 | 31 | 4,8 | 4,5 | 5 | 13,5 | 24 |
| ALS11 | 8 | 0,4 | 0,2 | 20 | 2,2 | 9 | 12 | 6 | 1 | 1,6 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1C |
| 2A | 3 | 12 | 1Y |
| 2B | 4 | 11 | 3C |
| 2C | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7412 TRIPLE 3-INPUT-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

$V_{cc} = 5V$ TREI CIRCUITE SI-NU CU TREI INTRARI CU COLECTORUL IN GOL

$Y = \overline{A.B.C}$ ; $V_{OH} = 5V$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 16 | 250 | 1,6 | 40 | 10 | 22 | 35 | 8 | 3 | 9 |
| LS12 | 8 | 100 | 0,4 | 20 | 2 | 16 | 17 | 15 | 0,7 | 1,8 |
| ALS12 | 8 | 100 | 0,2 | 20 | 1,25 | 18 | 20 | 15 | 0,32 | 1,2 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1C |
| 2A | 3 | 12 | 1Y |
| 2B | 4 | 11 | 3C |
| 2C | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7413 DUAL FOUR INPUT NAND SCHMITT TRIGGER

**Vcc = 5V** **DOUA TRIGGERE SCHMITT SI-NU CU PATRU INTRARI**

$Y = \overline{A.B.C.D}$ ; VT+ = 1,7V ; VT- = 0,9V

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ mA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 16 | 0,8 | 1,6 | 40 | 42 | 16,5 | 18 | 15 | 14 | 20 |
| LS13 | 8 | 0,4 | 0,4 | 20 | 9 | 16,5 | 15 | 18 | 2,9 | 4,1 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 2D |
| | 3 | 12 | 2C |
| 1C | 4 | 11 | |
| 1D | 5 | 10 | 2B |
| 1Y | 6 | 9 | 2A |
| GND | 7 | 8 | 2Y |

## 7414 HEX SCHMITT-TRIGGER INVERTERS

**Vcc = 5V** **SASE INVERSOARE TRIGGER-SCHMITT**

$Y = \overline{A}$ ; VT+ = 1,7V ; VT- = 0,9V

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ mA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | 16 | 0,8 | 1,2 | 40 | 26 | 15 | 15 | 15 | 22 | 39 |
| LS14 | 8 | 0,4 | 0,4 | 20 | 8,6 | 15 | 15 | 15 | 8,6 | 12 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1Y | 2 | 13 | 6A |
| 2A | 3 | 12 | 6Y |
| 2Y | 4 | 11 | 5A |
| 3A | 5 | 10 | 5Y |
| 3Y | 6 | 9 | 4A |
| GND | 7 | 8 | 4Y |

## 7415 TRIPLE 3-INPUT-AND GATES WITH OPEN COLLECTOR OUTPUTS

**Vcc = 5V** **TREI PORTI SI CU TREI INTRARI CU COLECTOR IN GOL**

Y = A.B.C ; VOH = 5V

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ uA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| H15 | 20 | 250 | 2 | 50 | 37,5 | 11 | 12 | 9 | 15 | 30 |
| LS15 | 8 | 100 | 0,4 | 20 | 4,3 | 19 | 20 | 17 | 1,8 | 3,3 |
| S15 | 20 | 250 | 2 | 50 | 28 | 6 | 5,5 | 6 | 10,5 | 24 |
| ALS15 | 8 | 100 | 0,2 | 20 | 2,25 | 15 | 20 | 10 | 1 | 1,66 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1C |
| 2A | 3 | 12 | 1Y |
| 2B | 4 | 11 | 3C |
| 2C | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7416 HEX INVERTER BUFFERS/DRIVERS WITH OPEN COLLECTOR HIGH-VOLTAGE OUTPUTS

**Vcc = 5V** **SASE INVERTOARE DE COMANDA CU COLECTOR IN GOL CU TENSIUNE RIDICATA L IESIRE**

$Y = \overline{A}$ ; VOH = 15V

| TIP 74 | $I_{0L}$ mA | $I_{0H}$ uA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 40 | 250 | 1,6 | 40 | 26 | 12,5 | 10 | 15 | 30 | 32 |

IDENTIC CU 7404

**7417 HEX BUFFERS/DRIVERS WITH OPEN COLLECTOR HIGH-VOLTAGE OUTPUTS**

**Vcc = 5V SASE CIRCUITE DE COMANDA CU COLECTOR IN GOL SI DE TENSIUNE RIDICATA IESIRE**

**Y = A ; V0H = 15V**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ uA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 40 | 250 | 1,6 | 40 | 21 | 13 | 6 | 20 | 29 | 21 |

**IDENTIC CU 7407**

**7418 DUAL FOUR INPUT NAND SCHMITT-TRIGGER**

**Vcc = 5V DOUA TRIGGERE SCHMITT SI-NU CU PATRU INTRARI**

**Y = A.B.C.D ; VT+ = 1,6V ; VT- = 0,8V**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| LS18 | 8 | 0,4 | 0,4 | 20 | 9 | 17 | 15 | 18 | 2,9 | 4,1 |

**IDENTIC CU 7413**

**7419 HEX SCHMITT TRIGGER INVERTERS**

**Vc = 5V SASE INVERTOARE TRIGGERE SCHMITT**

**$Y = \overline{A}$ ; VT+ = 1,6V ; VT- = 0,8V**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| LS19 | 8 | 0,4 | 0,4 | 20 | 8,6 | 15 | 15 | 15 | 8,6 | 12 |

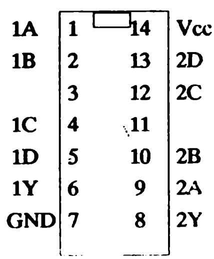
**IDENTIC CU 7414**

**7420 DUAL 4-INPUT NAND GATES**

**Vcc = 5V DOUA PORTI SI-NU CU PATRU INTRARI**

**$Y = \overline{A.B.C.D}$**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 16 | 0,4 | 1,6 | 40 | 10 | 10 | 12 | 8 | 2 | 6 |
| LS20 | 8 | 0,4 | 0,4 | 20 | 2 | 9,5 | 9 | 10 | 0,4 | 1,2 |
| S20 | 20 | 1 | 2 | 50 | 19 | 3 | 3 | 3 | 5 | 10 |
| ALS20 | 8 | 0,4 | 0,2 | 20 | 1,25 | 9,5 | 4 | 15 | 0,22 | 0,81 |
| H20 | 20 | 0,5 | 2 | 50 | 22,5 | 6,5 | 6 | 7 | 5 | 13 |
| L20 | 2 | 0,2 | 0,18 | 10 | 1 | 33 | 35 | 31 | 0,22 | 0,58 |



**7421** DUAL 4-INPUT AND GATES

Vcc = 5V DOUA PORTI SI-NU CU 4 INTRARI

Y = A.B.C.D

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| LS21 | 8 | 0,4 | 0,4 | 20 | 4,3 | 9 | 8 | 10 | 1,2 | 2,2 |
| ALS21 | 8 | 0,4 | 0,4 | 20 | 2,25 | 8,5 | 12 | 5 | 0,67 | 1,1 |
| H21 | 20 | 0,5 | 2 | 50 | 40 | 8,2 | 7,6 | 8,8 | 12 | 20 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 2D |
| | 3 | 12 | 2C |
| 1C | 4 | 11 | |
| 1D | 5 | 10 | 2B |
| 1Y | 6 | 9 | 2A |
| GND | 7 | 8 | 2Y |

**7422** DUAL 4-INPUT NAND GATES WITH OPEN-COLLECTOR OUTPUTS

Vcc = 5V DOUA PORTI SI-NU CU 4 INTRARI SI COLECTOR IN GOL

$Y = \overline{A.B.C.D}$ ; V0H = 5V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 16 | 250 | 1,6 | 40 | 10 | 22 | 35 | 8 | 2 | 6 |
| LS22 | 8 | 100 | 0,4 | 20 | 2 | 16 | 17 | 15 | 0,4 | 1,2 |
| S22 | 20 | 250 | 2 | 50 | 16,2 | 5 | 5 | 4,5 | 3 | 10 |
| ALS22 | 8 | 100 | 0,2 | 20 | 1,25 | 20 | 20 | 19 | 0,22 | 0,8 |
| H22 | 20 | 250 | 2 | 50 | 20,5 | 9 | 10 | 7,5 | 0,5 | 13 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 2D |
| | 3 | 12 | 2C |
| 1C | 4 | 11 | |
| 1D | 5 | 10 | 2B |
| 1Y | 6 | 9 | 2A |
| GND | 7 | 8 | 2Y |

**7423** EXPANDABLE DUAL 4-INPUT NOR GATES WITH STROBE

Vcc = 5V DOUA PORTI SAU-NU EXPANDABILE CU 4 INTRARI SI CU STROBARE

$1Y = \overline{1G(1A + 1B + 1C + 1D) + X}$ ; X = OUTPUT OF 7460

$2Y = \overline{2G(2A + 2B + 2C + 2D)}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 16 | 0,8 | 1,6 | 40 | 23 | 10,5 | 13 | 8 | 8 | 10 |
| STROBE G | | | 6,4 | 160 | | | | | | |

| | | | |
|---|---|---|---|
| 1X | 1 | 16 | Vcc |
| 1A | 2 | 15 | $\overline{1X}$ |
| 1B | 3 | 14 | 2D |
| 1G | 4 | 13 | 2C |
| 1C | 5 | 12 | 2G |
| 1D | 6 | 11 | 2B |
| 1Y | 7 | 10 | 2A |
| GND | 8 | 9 | 2Y |

**7424** QUADRUPLE 2 INPUT NAND SCHMITT TRIGGER

Vcc = 5V PATRU TRIGGERE SCHMITT SI-NU CU 2 INTRARI

Y = A.B ; VT+ = 1,6V ; VT- = 0,8V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| LS24 | 8 | 0,4 | 0,4 | 20 | 8,5 | 16 | 15 | 17 | 5,4 | 8 |

IDENTIC CU 7400

**7425 DUAL 4-INPUT NOR GATES WITH STROBE**

**Vcc=5V DOUA PORTI SAU-NU CU 4 INTRARI SI CU STROBARE**

$Y=\overline{G(A+B+C+D)}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 16 | 0,8 | 1,6 | 40 | 23 | 10,5 | 13 | 8 | 8 | 10 |
| STROB G | | | 6,4 | 160 | | | | | | |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 2D |
| 1G | 3 | 12 | 2C |
| 1C | 4 | 11 | 2G |
| 1D | 5 | 10 | 2B |
| 1Y | 6 | 9 | 2D |
| GND | 7 | 8 | 2Y |

**7426 QUADRUPLE 2-INPUT HIGH-VOLTAGE INTERFACE NAND GATES**

**Vcc=5V PATRU PORTI SI-NU CU 2 INTRARI CU COLECTOR IN GOL**

$Y=\overline{A.B}$ ; $V0H=15V$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 16 | 1 | 1,6 | 40 | 10 | 13,5 | 16 | 11 | 4 | 12 |
| LS26 | 8 | 1 | 0,4 | 20 | 2 | 16 | 17 | 15 | 0,8 | 2,4 |

IDENTIC CU 7400

**7427 TRIPLE 3-INPUT NOR GATES**

**Vcc=5V TREI PORTI SAU-NU CU TREI INTRARI**

$Y=\overline{A+B+C}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 16 | 0,8 | 1,6 | 40 | 22 | 8,5 | 10 | 7 | 10 | 16 |
| LS27 | 8 | 0,4 | 0,4 | 20 | 4,5 | 10 | 10 | 10 | 2 | 3,4 |
| ALS27 | 8 | 0,4 | 0,2 | 20 | 2,5 | 6 | 9 | 3 | 0,97 | 2 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1C |
| 2A | 3 | 12 | 1Y |
| 2B | 4 | 11 | 3C |
| 2C | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

**7428 QUADRUPLE 2-INPUT NOR GATES**

**Vcc=5V PATRU PORTISAU-NU CU 2 INTRARI**

$Y=\overline{A+B}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 28 | 48 | 2,4 | 1,6 | 40 | 28 | 7 | 6 | 8 | 12 | 33 |
| LS28 | 24 | 1,2 | 0,4 | 20 | 5,5 | 12 | 12 | 12 | 1,8 | 6,9 |
| ALS28 | 24 | 2,6 | 0,2 | 20 | 4 | 4 | 4 | 4 | 1,7 | 4,8 |

IDENTIC CU 7402

**7430** **8-INPUT NAND GATES**

**Vcc=5V** **POARTA SI-NU CU 8 INTRARI**

$Y=\overline{A.B.C.D.E.F.G.H}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 16 | 0,4 | 1,6 | 40 | 10 | 11 | 13 | 8 | 1 | 3 |
| LS30 | 8 | 0,4 | 0,4 | 20 | 2,4 | 11 | 8 | 13 | 0,35 | 0,6 |
| S30 | 20 | 1 | 2 | 50 | 21 | 4 | 4 | 4,5 | 3 | 5,5 |
| ALS30 | 8 | 0,4 | 0,2 | 20 | 1,9 | 7 | 4 | 10 | 0,22 | 0,54 |
| H30 | 20 | 0,5 | 2 | 50 | 22,5 | 7,9 | 6,8 | 8,9 | 2,5 | 6,56 |
| L30 | 3,6 | 0,2 | 0,18 | 20 | 1 | 53 | 35 | 70 | 0,11 | 0,29 |

| | | | |
|---|---|---|---|
| A | 1 | 14 | Vcc |
| B | 2 | 13 | |
| C | 3 | 12 | H |
| D | 4 | 11 | G |
| E | 5 | 10 | |
| F | 6 | 9 | |
| GND | 7 | 8 | Y |

**7432** **QUADRUPLE 2-INPUT OR GATES**

**Vcc=5V** **PATRU PORTI SAU CU 2 INTRARI**

$Y=\overline{A+B}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 16 | 0,8 | 1,6 | 40 | 24 | 12 | 10 | 14 | 15 | 23 |
| LS32 | 8 | 0,4 | 0,4 | 20 | 5 | 14 | 14 | 14 | 3,1 | 4,9 |
| S32 | 20 | 1 | 2 | 50 | 35 | 4 | 4 | 4 | 18 | 38 |
| ALS32 | 8 | 0,4 | 0,4 | 20 | 2,8 | 5,5 | 6 | 5 | 1,9 | 2,6 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3Y |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

**7433** **QUADRUPLE 2-INPUT NOR BUFFERS WITH OPEN COLLECTOR OUTPUTS**

**Vcc=5V** **PATRU PORTI SAU-NU CU 2 INTRARI DE PUTERE CU COLECTOR IN GOL**

$Y=\overline{A+B}$ ; $V_{OH}=5V$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | 48 | 250 | 1,6 | 40 | 28 | 11 | 10 | 12 | 12 | 33 |
| LS33 | 24 | 250 | 0,4 | 20 | 5,5 | 19 | 20 | 18 | 1,8 | 6,9 |
| ALS33 | 24 | 100 | 0,2 | 20 | 4 | 14 | 20 | 9 | 1,7 | 4,8 |

| | | | |
|---|---|---|---|
| 1Y | 1 | 14 | Vcc |
| 1A | 2 | 13 | 4Y |
| 1B | 3 | 12 | 4B |
| 2Y | 4 | 11 | 4A |
| 2A | 5 | 10 | 3B |
| 2B | 6 | 9 | 3B |
| GND | 7 | 8 | 3A |

## 7437 QUADRUPLE 2-INPUT NAND BUFFERS

**Vcc=5V PATRU PORTI SI-NU CU 2 INTRARI DE PUTERE**

$Y=\overline{A.B}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 37 | 48 | 1,2 | 1,2 | 40 | 27 | 10 | 13 | 8 | 9 | 34 |
| LS37 | 24 | 1,2 | 0,4 | 20 | 4,3 | 12 | 12 | 12 | 0,9 | 6 |
| S37 | 60 | 3 | 4 | 100 | 41 | 4 | 4 | 4 | 20 | 46 |
| ALS37 | 24 | 2,6 | 0,2 | 20 | 3 | 4 | 4 | 4 | 0,86 | 4 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7438 QUADRUPLE 2-INPUT NAND BUFFERS WITH OPEN-COLLECTOR OUTPUTS

**Vcc=5V PATRU PORTI SI-NU CU 2 INTRARI DE PUTERE CU COLECTOR IN GOL**

$Y=\overline{A.B}$ ; $V_{OH}=5V$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 38 | 48 | 250 | 1,6 | 40 | 24,5 | 12,5 | 14 | 11 | 5 | 34 |
| LS38 | 24 | 250 | 0,4 | 20 | 4,3 | 19 | 20 | 18 | 0,9 | 6 |
| S38 | 60 | 250 | 4 | 100 | 41 | 6,5 | 6,5 | 6,5 | 20 | 46 |
| ALS38 | 24 | 100 | 0,2 | 20 | 3 | 14,5 | 20 | 9 | 0,86 | 4 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

## 7440 DUAL 4-INPUT NAND BUFFERS

**Vcc=5V DOUA PORTI SI-NU CU 4-INTRARI DE PUTERE**

$Y=\overline{A.B}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 48 | 1,2 | 1,6 | 40 | 26 | 10,5 | 13 | 8 | 4 | 17 |
| LS40 | 24 | 1,2 | 0,4 | 20 | 4,3 | 12 | 12 | 12 | 0,45 | 3 |
| S40 | 60 | 3 | 4 | 100 | 44 | 6 | 6 | 6 | 10 | 25 |
| ALS40 | 24 | 2,6 | 0,2 | 20 | 3 | 4 | 4 | 4 | 0,43 | 2 |
| H40 | 60 | 1,5 | 4 | 100 | 44 | 7,5 | 8,5 | 6,5 | 10,5 | 25 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 2D |
| | 3 | 12 | 2C |
| 1C | 4 | 11 | |
| 1D | 5 | 10 | 2B |
| 1Y | 6 | 9 | 2A |
| GND | 7 | 8 | 2Y |

## 7442 4-LINE-TO-10-LINE DECODERS/BCD-TO-DECIMAL

**Vcc=5V DECODIFICATOR 4 IN 10/BCD-ZECIMAL**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $I_{cc}$ mA | $t_{pd}$ ns | $t_{pHL}$ ns | $t_{pLH}$ ns |
|---|---|---|---|---|---|---|---|---|---|
| 42A | 16 | 0,8 | 1,6 | 40 | 140 | 28 | 17 | 17 | 17 |
| L42 | 8 | 0,4 | 0,8 | 20 | 70 | 14 | 49 | 46 | 52 |
| LS42 | 8 | 0,4 | 0,4 | 20 | 35 | 7 | 20 | 20 | 20 |

| No | BCD-INPUT | | DECIMAL-OUTPUT | | | | |
|---|---|---|---|---|---|---|---|
| | DC | BA | 01 | 23 | 45 | 67 | 89 |
| 0 | LL | LL | LH | HH | HH | HH | HH |
| 1 | LL | LH | HL | HH | HH | HH | HH |
| 2 | LL | HL | HH | LH | HH | HH | HH |
| 3 | LL | HH | HH | HL | HH | HH | HH |
| 4 | LH | LL | HH | HH | LH | HH | HH |
| 5 | LH | LH | HH | HH | HL | HH | HH |
| 6 | LH | HL | HH | HH | HH | LH | HH |
| 7 | LH | HH | HH | HH | HH | HL | HH |
| 8 | HL | LL | HH | HH | HH | HH | LH |
| 9 | HL | LH | HH | HH | HH | HH | HL |
| 10-15 | HX | XX | HH | HH | HH | HH | HH |

| | | | |
|---|---|---|---|
| 0 | 1 | 16 | Vcc |
| 1 | 2 | 15 | A |
| 2 | 3 | 14 | B |
| 3 | 4 | 13 | C |
| 4 | 5 | 12 | D |
| 5 | 6 | 11 | 9 |
| 6 | 7 | 10 | 8 |
| GND | 8 | 9 | 7 |

X=L/H

**7443** **4-LINE-TO-10-LINE DECODERS/EXCESS-3-TO-DECIMAL**

**Vcc=5V** **DECODIFICATOR 4 IN 10/EXCES DE 3-ZECIMAL**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $I_{cc}$ mA | $t_{pd}$ ns | $t_{pHL}$ ns | $t_{pLH}$ ns | TIP 74 |
|---|---|---|---|---|---|---|---|---|---|---|
| 43A | 16 | 0,8 | 1,6 | 40 | 140 | 28 | 17 | 17 | 1 | 44A |
| L43 | 8 | 0,4 | 0,8 | 20 | 70 | 14 | 49 | 46 | 52 | L44 |

**IDENTIC CU 7442**

| | 7443 | | | | | | | 7444 | |
|---|---|---|---|---|---|---|---|---|---|
| No | EX3-INPUT | | DECIMAL-OUTPUT | | | | | EX3 GRAY-IN. | |
| | AB | CD | 01 | 23 | 45 | 67 | 89 | AB | C D |
| 0 | LL | HH | LH | HH | HH | HH | HH | LL | H L |
| 1 | LH | LL | HL | HH | HH | HH | HH | LH | H L |
| 2 | LH | LH | HH | LH | HH | HH | HH | LH | H H |
| 3 | LH | HL | HH | HL | HH | HH | HH | LH | L H |
| 4 | LH | HH | HH | HH | LH | HH | HH | LH | L L |
| 5 | HL | LL | HH | HH | HL | HH | HH | HH | L L |
| 6 | HL | LH | HH | HH | HH | LH | HH | HH | L H |
| 7 | HL | HL | HH | HH | HH | HL | HH | HH | H H |
| 8 | HL | HH | HH | HH | HH | HH | LH | HH | H L |
| 9 | HH | LL | HH | HH | HH | HH | HL | HL | H L |
| 10-15 | XX | XX | HH | HH | HH | HH | HH | XX | X X |

X = H/L

**7444** **4-LINE-TO-10-LINE DECODERS/EXCESS-3 GRAY-TO DECIMAL**

**DECODIFICATOR 4 IN 10/EX-3 GRAY-ZECIMAL**

**VEZI 7443**

**7445** **BCD-TO-DECIMAL DECODER/DRIVER**

**Vcc = 5V** **DECODIFICATOR DE PUTERE /IESIREA IN GOL ;** **$V_{OH}$ = 30V**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $I_{cc}$ mA | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|---|
| 45 | 80 | 250 | 1,6 | 40 | 215 | 43 | 50 | 50 | 50 |

**DISPUNEREA PINILOR SI TABELA DE FUNCTII IDENTIC CU 7442**

**BCD-TO-SEVEN-SEGMENT DECODERS/DRIVERS**

**7446** **ACTIVE-LOW,OPEN-COLLECTOR,30V OUTPUTS**

**7447** **ACTIVE-LOW,OPEN-COLLECTOR,15V OUTPUTS**

**7448** **INTERNAL PULL-UP-OUTPUTS**

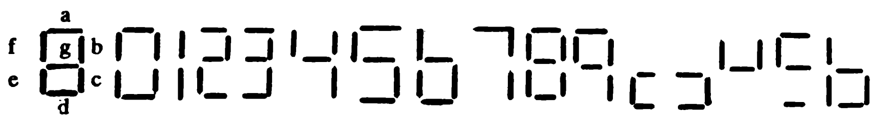
**7449** **OPEN COLLECTOR OUTPUTS**

**Vcc = 5V** **DECODIFICATOARE DE PUTERE/BCD-7 SEGMENTE**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{O(on)}$ mA | $I_{O(off)}$ µA | $P_{cc}$ mW | $I_{cc}$ mA | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $V_{OH}$ V |
|---|---|---|---|---|---|---|---|---|---|---|
| 46A | 8 | 200 | 40 | 250 | 320 | 64 | 100 | 100 | 100 | 30 |
| L46 | 4 | 100 | 20 | 250 | 160 | 32 | 200 | 200 | 200 | 30 |
| 47A | 8 | 200 | 40 | 250 | 320 | 64 | 100 | 100 | 100 | 15 |
| L47 | 4 | 100 | 20 | 250 | 160 | 32 | 200 | 200 | 200 | 15 |
| LS47 | 3,2 | 50 | 24 | 250 | 35 | 7 | 100 | 100 | 100 | 15 |
| 48 | 8 | 200 | 6,4 | 400 | 265 | 53 | 100 | 100 | 100 | 5 |
| LS48 | 3,2 | 50 | 6 | 100 | 125 | 25 | 100 | 100 | 100 | 5 |
| 49 | 10 | 250 | - | - | 165 | 33 | 100 | 100 | 100 | 5 |
| LS49 | 8 | 250 | - | - | 40 | 8 | 100 | 100 | 100 | 5 |
| | | | SEGMENTE | | | | | | | |

**7446**
**7447**
**7448**

| | | | |
|---|---|---|---|
| B | 1 | 16 | Vcc |
| C | 2 | 15 | f |
| LT | 3 | 14 | g |
| RBo | 4 | 13 | a |
| RBI | 5 | 12 | b |
| D | 6 | 11 | c |
| A | 7 | 10 | d |
| GND | 8 | 9 | e |




0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

**7449**

| | | | |
|---|---|---|---|
| B | 1 | 14 | Vcc |
| C | 2 | 13 | f |
| BI | 3 | 12 | g |
| D | 4 | 11 | a |
| A | 5 | 10 | b |
| e | 6 | 9 | c |
| GND | 7 | 8 | d |

| DECIMAL FUNCT | LT | RBI | INPUTS D C | B A | RBo | BI OUTPUTS (46,47) a | b | c | d | e | f | g | OUTPUTS (48,49) a b | c d | e f | g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | H | H | L L | L L | H | ON | ON | ON | ON | ON | ON | OFF | H H | H H | H H | L |
| 1 | H | X | L L | L H | H | OFF | ON | ON | OFF | OFF | OFF | OFF | L H | H L | L L | L |
| 2 | H | X | L L | H L | H | ON | ON | OFF | ON | ON | OFF | ON | H H | L H | H L | L |
| 3 | H | X | L L | H H | H | ON | ON | ON | ON | OFF | OFF | ON | H H | H H | L L | H |
| 4 | H | X | L H | L L | H | OFF | ON | ON | OFF | OFF | ON | ON | L H | H L | L H | H |
| 5 | H | X | L H | L H | H | ON | OFF | ON | ON | OFF | ON | ON | H L | H H | L H | H |
| 6 | H | X | L H | H L | H | OFF | OFF | ON | ON | ON | ON | ON | L L | H H | H H | H |
| 7 | H | X | L H | H H | H | ON | ON | ON | OFF | OFF | OFF | OFF | H H | H L | L L | L |
| 8 | H | X | H L | L L | H | ON | ON | ON | ON | ON | ON | ON | H H | H H | H H | H |
| 9 | H | X | H L | L H | H | ON | ON | ON | OFF | OFF | ON | ON | H H | H L | L H | H |
| 10 | H | X | H L | H L | H | OFF | OFF | OFF | ON | ON | OFF | ON | L L | L H | H L | H |
| 11 | H | X | H L | H H | H | OFF | OFF | ON | ON | OFF | OFF | ON | L L | H H | L L | H |
| 12 | H | X | H H | L L | H | OFF | ON | OFF | OFF | OFF | ON | ON | L H | L L | L H | H |
| 13 | H | X | H H | L H | H | ON | OFF | OFF | ON | OFF | ON | ON | H L | L H | L H | H |
| 14 | H | X | H H | H L | H | OFF | OFF | OFF | ON | ON | ON | ON | L L | L H | H H | H |
| 15 | H | X | H H | H H | H | OFF | OFF | OFF | OFF | OFF | OFF | OFF | L L | L L | L L | L |
| BI/RBo | X | X | X X | X X | L | OFF | OFF | OFF | OFF | OFF | OFF | OFF | L L | L L | L L | L |
| RBI | H | L | L L | L L | L | OFF | OFF | OFF | OFF | OFF | OFF | OFF | L L | L L | L L | L |
| LT | L | X | X X | X X | H | ON | ON | ON | ON | ON | ON | ON | H H | H H | H H | H |

**7450** DUAL 2-WIDE 2-INPUT AND-OR-INVERT-GATES

Vcc = 5V DOUA PORTI SI-SAU-NU EXPANDABILA CU 2 INTRRI

$Y = \overline{A.B + C.D + X}$ ; X = OUTPUT OF 7460

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 16 | 0,4 | 1,6 | 40 | 14 | 10,5 | 13 | 8 | 4 | 7,4 |
| H50 | 20 | 0,5 | 2 | 50 | 29 | 6,5 | 6,8 | 6,2 | 8,2 | 15,2 |

$1Y = \overline{A.B + C.D + X}$

$2Y = \overline{A.B + C.D}$

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 2A | 2 | 13 | 1B |
| 2B | 3 | 12 | $\overline{1X}$ |
| 2C | 4 | 11 | 1X |
| 2D | 5 | 10 | 1D |
| 2Y | 6 | 9 | 1C |
| GND | 7 | 8 | 1Y |

## 7451 AND-OR-INVERT GATES

Vcc=5V 2 PORTI SI-SAU-NU CU 2/3 INTRARI

$1Y = 2Y = \overline{A.B + C.D}$ (51,H51,S51)

$1Y = \overline{A.B.C + D.E.F}$ (L51, LS51) $2Y = \overline{A.B + C.D}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{IL}$ mA | $I_{IH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 51 | 16 | 0,4 | 1,6 | 40 | 14 | 10,5 | 13 | 8 | 4 | 7,4 |
| H51 | 20 | 0,5 | 2 | 50 | 29 | 6,5 | 6,8 | 6,2 | 8,2 | 15,2 |
| S51 | 20 | 1 | 2 | 50 | 27 | 3,5 | 3,5 | 3,5 | 8,2 | 13,6 |
| L51 | 3,6 | 0,2 | 0,18 | 10 | 1,5 | 42 | 50 | 35 | 0,44 | 0,76 |
| LS51 | 8 | 0,4 | 0,4 | 20 | 2,8 | 12 | 12 | 12,5 | 0,8 | 1,4 |

| | | | | | |
|---|---|---|---|---|---|
| 1A | 1 | 1A | Vcc | 14 | Vcc |
| 2A | 2 | 2A | 1C | 13 | 1B |
| 2B | 3 | 2B | 1B | 12 | |
| 2C | 4 | 2C | 1F | 11 | |
| 2D | 5 | 2D | 1E | 10 | 1D |
| 2Y | 6 | 2Y | 1D | 9 | 1C |
| GND | 7 | GND | 1Y | 8 | 1Y |

(L51,LS51 interior)

## 7452 EXPANDABLE 4-WIDE AND-OR GATES

Vcc=5V POARTA SI-SAU EXPANDABILA

$Y = A.B + C.D.E + F.G + H.I + X$ ( X = OUTPUTS 7461)

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{IL}$ mA | $I_{IH}$ uA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| H52 | 20 | 0,5 | 2 | 50 | 87 | 10 | 10,6 | 9,2 | 20 | 15,2 |

$Y = A.B + C.D + E.F + G.H.I + X$

( varianta H52W - vezi interior )

| | | | | | |
|---|---|---|---|---|---|
| A | 1 | A | B | 14 | Vcc |
| B | 2 | C | X | 13 | I |
| C | 3 | D | Y | 12 | H |
| D | 4 | Vcc | GND | 11 | G |
| E | 5 | E | | 10 | F |
| | 6 | F | I | 9 | X |
| GND | 7 | G | H | 8 | Y |

## 7453 EXPANDABLE 4-WIDE AND-OR-INVERT GATES

Vcc=5V POARTA SI-SAU-NU EXPANDABILA

$Y = \overline{A.B + C.D + E.F + G.H + X}$ (53) X = OUTPUT 7460

$Y = \overline{A.B + C.D + E.F.G + H.I + X}$ (H53) X = OUTPUT 74H60;74H62

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{IL}$ mA | $I_{IH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 53 | 16 | 0,4 | 1,6 | 40 | 23 | 10,5 | 13 | 8 | 4 | 5,1 |
| H53 | 20 | 0,5 | 2 | 50 | 41 | 6,6 | 7 | 6,2 | 7,1 | 9,4 |

( H53 in interior )

| | | | | | |
|---|---|---|---|---|---|
| A | 1 | A | Vcc | 14 | Vcc |
| C | 2 | C | B | 13 | B |
| D | 3 | D | $\overline{X}$ | 12 | $\overline{X}$ |
| E | 4 | E | X | 11 | X |
| F | 5 | F | I | 10 | H |
| | 6 | G | H | 9 | G |
| GND | 7 | GND | Y | 8 | Y |

## 7454 4-WIDE AND-OR-INVERT GATES

Vcc = 5V POARTA SI-SAU-NU

$Y = \overline{A.B + C.D + E.F + G.H}$ (54) $Y = \overline{A.B + C.D + E.F.G. + H.I}$ (H54)

$Y = \overline{A.B + C.D.E + F.G.H. + I.J}$ (L54,LS54)

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 54 | 16 | 0,4 | 1,6 | 40 | 23 | 10,5 | 13 | 8 | 4 | 5,1 |
| H54 | 20 | 0,5 | 2 | 50 | 41 | 6,5 | 7 | 6,2 | 7,1 | 9,4 |
| L54 | 3,6 | 0,2 | 0,18 | 10 | 2,5 | 42 | 50 | 35 | 0,39 | 0,6 |
| LS54 | 8 | 0,4 | 0,4 | 20 | 4,5 | 12 | 12 | 12,5 | 0,8 | 1 |

| 54 H54 L54 | Pin | Pin | L54 H54 54 |
|---|---|---|---|
| AAA | 1 | 14 | Vcc |
| CCB | 2 | 13 | jBB |
| DDC | 3 | 12 | I |
| EED | 4 | 11 | H |
| FFE | 5 | 10 | GIH |
| GY | 6 | 9 | FHG |
| GND | 7 | 8 | YYY |

## 7455 2-WIDE 4-INPUT AND-OR-INVERT GATES

Vcc = 5V POARTA SI-SAU-NU

$Y = \overline{A.B.C.D + E.F.G.H + X}$ (H55-EXPANDABLE;X = 74H62)

$Y = \overline{A.B.C.D + E.F.G.H}$ (L55;LS55)

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| L55 | 3,6 | 0,2 | 0,18 | 10 | 1,5 | 41 | 50 | 35 | 0,22 | 0,38 |
| LS55 | 8 | 0,4 | 0,4 | 20 | 2,8 | 12 | 12 | 12,5 | 0,4 | 0,7 |
| H55 | 20 | 0,5 | 2 | 50 | 30 | 6,7 | 7 | 6,5 | 4,5 | 7,5 |

| H55 L55 | Pin | Pin | L55 H55 |
|---|---|---|---|
| A A | 1 | 14 | Vcc |
| B B | 2 | 13 | H H |
| C C | 3 | 12 | G G |
| D D | 4 | 11 | F F |
| X | 5 | 10 | E E |
| | 6 | 9 | $\overline{X}$ |
| GND | 7 | 8 | Y Y |

## 7460 DUAL 4-INPUT EXPANDERS

Vcc = 5V DOUA CIRCUITE DE EXPANDARE

X = A.B.C.D ( conectat la 7423;7450;7453;7455 )

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| 60 | | | 1,6 | 40 | 4 | 2 | 2 | 2 | 1,2 | 2 |
| H60 | | | 2 | 50 | 6 | 2,7 | 4,2 | 1,2 | 1,9 | 3 |

| | Pin | Pin | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 1D |
| 1C | 3 | 12 | 1X |
| 2A | 4 | 11 | $\overline{1X}$ |
| 2B | 5 | 10 | 2X |
| 2C | 6 | 9 | $\overline{2X}$ |
| GND | 7 | 8 | 2D |

**7461** **TRIPLE 3-INPUT EXPANDERS**

**Vcc = 5V** **TREI CIRCUITE DE EXPANDARE**

**X = A.B.C** **( X conectat la 74H52 )**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| H61 | | | 2 | 50 | 13 | 2,4 | 4,2 | 0,6 | 11 | 5 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 3C |
| 1C | 3 | 12 | 3B |
| 2A | 4 | 11 | 3A |
| 2B | 5 | 10 | 3X |
| 2C | 6 | 9 | 1X |
| GND | 7 | 8 | 2X |

**7462** **4 WIDE AND-OR EXPANDERS**

**Vcc = 5V** **CIRCUIT SI-SAU DE EXPANDARE**

**X = A.B + C.D.E + F.G.H + i.j** **( X conectat la 74H50;74H53;74H55 )**

**X = A.B.C + D.E + F.G + H.i.j** **( varianta H62w )**

| TIP 74 | | | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| H62 | | | 2 | 50 | 24 | 2,2 | 3,2 | 1,2 | 6 | 3,8 |

| H62w | H62 | | | H62 | H62w |
|---|---|---|---|---|---|
| A | A | 1 | 14 | Vcc | C |
| D | B | 2 | 13 | j | B |
| E | C | 3 | 12 | i | X |
| $V_{cc}$ | D | 4 | 11 | H | GND |
| F | E | 5 | 10 | G | $\overline{X}$ |
| G | $\overline{X}$ | 6 | 9 | F | j |
| H | GND | 7 | 8 | X | i |

**7463** **HEX CURRENT-SENSING INTERFACE GATES**

**Vcc = 5V** **SASE CIRCUITE DE INTERFATA**

**Y = A**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ µA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| LS63 | 8 | 0,4 | 50 | 200 | 40 | 21 | 27 | 15 | 8 | - |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1Y | 2 | 13 | 6A |
| 2Y | 3 | 12 | 6Y |
| 2A | 4 | 11 | 5Y |
| 3A | 5 | 10 | 5A |
| 3Y | 6 | 9 | 4A |
| GND | 7 | 8 | 4Y |

**4-2-3-2 INPUT AND-OR-INVERT GATES**

**7464** **POARTA SI-SAU-NU**

**7465** **POARTA SI-SAU-NU CU COLECTOR IN GOL V0H = 5V**

**Y =** $\overline{A.B.C.D + E.F + G.HI + j.K}$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $I_{CCH}$ mA | $I_{CCL}$ mA |
|---|---|---|---|---|---|---|---|---|---|---|
| S64 | 20 | 1 | 2 | 50 | 39 | 3,5 | 3,5 | 3,5 | 7 | 8,5 |
| S65 | 20 | 0,25 | 2 | 50 | 36 | 5,5 | 5 | 5,5 | 6 | 8,5 |

| | | | |
|---|---|---|---|
| A | 1 | 14 | Vcc |
| E | 2 | 13 | D |
| F | 3 | 12 | C |
| G | 4 | 11 | B |
| H | 5 | 10 | K |
| i | 6 | 9 | j |
| GND | 7 | 8 | Y |

## 7470 AND-GATED j-k POZITIVE-EDGE-TRIGGERED FLIP-FLOPS WITH PRESET AND CLEAR

Vcc = 5V BISTABIL CU SI PE INTRARILE j_k,DECLANSAT PE FRONT POZITIV,CU SET SI RESET

| TIP 74 | TACT | FRECV MHz | P/F-F mW | tSETUP ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| 70 | L-H | 35 | 65 | 20↑ | [illegible] | 23 | 27 | 17 |

| | | | | |
|---|---|---|---|---|
| 1 | 14 | Vcc |
| CLR | 2 | 13 | PR |
| j1 | 3 | 12 | CK |
| j2 | 4 | 11 | K2 |
| $\overline{j}$ | 5 | 10 | $\overline{K1}$ |
| $\overline{Q}$ | 6 | 9 | K |
| GND | 7 | 8 | Q |

| INPUTS | | | | | OUTPUTS | |
|---|---|---|---|---|---|---|
| PRSET | CLEAR | CLOCK | j | k | Q | $\overline{Q}$ |
| L | H | L | X | X | H | L |
| H | L | L | X | X | L | H |
| L | L | X | X | X | L* | L* |
| H | H | ↑ | L | L | Qo | $\overline{Qo}$ |
| H | H | ↑ | H | L | H | L |
| H | H | ↑ | L | H | L | H |
| H | H | ↑ | H | H | $\overline{Qo}$ | Qo |
| H | H | L | X | X | Qo | $\overline{Qo}$ |

$j = j1.j2.\overline{j}$

$k = k1.k2.\overline{k}$

## 7471 AND-OR-GATES j-K MASTER-SLAVE FLIP-FLOPS WITH PRESET

Vcc = 5V BISTABIL STAPIN-SCLAV CU SI-SAU PE INTRARILE j-K CU SET

| TIP 74 | TACT | FRECV MHz | P/F-F mW | tSETUP ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| H71 | H-L | 30 | 80 | 0↑ | 0↓ | 18 | 14 | 22 |
| L71 | H-L | 3 | 3,8 | 0↑ | 0↓ | 42 | 35 | 60 |

| INPUTS H71 | | | | OUTPUTS | |
|---|---|---|---|---|---|
| PRESET | CLCK | j | k | Q | $\overline{Q}$ |
| L | X | X | X | H | L |
| H | ↓ | L | L | Qo | $\overline{Qo}$ |
| H | ↓ | H | L | H | L |
| H | ↓ | L | H | L | H |
| H | ↓ | H | H | $\overline{Qo}$ | Qo |

| | | | |
|---|---|---|---|
| j1A | 1 | 14 | Vcc |
| j1B | 2 | 13 | CK |
| j2A | 3 | 12 | K2B |
| j2B | 4 | 11 | K2A |
| PR | 5 | 10 | K1B |
| Q | 6 | 9 | K1A |
| GND | 7 | 8 | $\overline{Q}$ |

j = (j1A.j1B) + (j2A.j2B)

K = (K1A.K1B) + (K2A.K2B)

## L71 AND-GATED R-S MASTER-SLAVE FLIP-FLOP WITH PRESET AND CLEAR

| INPUTS L71 | | | | | OUTPUTS | |
|---|---|---|---|---|---|---|
| PRESET | CLEAR | CLOCK | R | S | Q | $\overline{Q}$ |
| L | H | X | X | X | H | L |
| H | L | X | X | X | L | H |
| L | L | X | X | X | H* | H* |
| H | H | ↓ | L | L | Qo | $\overline{Qo}$ |
| H | H | ↓ | H | L | H | L |
| H | H | ↓ | L | H | L | H |
| H | H | ↓ | H | H | * | * |

| | | | |
|---|---|---|---|
| | 1 | 14 | Vcc |
| CLR | 2 | 13 | PR |
| S1 | 3 | 12 | CK |
| S2 | 4 | 11 | R3 |
| S3 | 5 | 10 | R2 |
| $\overline{Q}$ | 6 | 9 | R1 |
| GND | 7 | 8 | Q |

R = R1.R2.R3

S = S1.S2.S3

* = configuratie nedeterminata

H* = configuratie nestabila

## 7472 AND-GATED j-K MASTER-SLAVE FLIP-FLOPS WITH PRESET AND CLEAR

**Vcc = 5V BISTABIL j-K MASTER-SLAVE**

| TIP 74 | TACT | FRECV MHz | P/F-F mW | $t_{SETUP}$ ns | $t_{HOLD}$ ns | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| 72 | H-L | 20 | 50 | 0↑ | 0↓ | 20 | 16 | 25 |
| H72 | H-L | 30 | 80 | 0↑ | 0↓ | 18 | 14 | 22 |
| L72 | H-L | 3 | 3,8 | 0↑ | 0↓ | 42 | 35 | 60 |

| INPUTS | | | | | OUTPUTS | |
|---|---|---|---|---|---|---|
| PRSET | CLEAR | CLCK | j | K | Q | $\overline{Q}$ |
| L | H | X | X | X | H | L |
| H | L | X | X | X | L | H |
| L | L | X | X | X | H* | H* |
| H | H | ↓ | L | L | Qo | $\overline{Qo}$ |
| H | H | ↓ | H | L | H | L |
| H | H | ↓ | L | H | L | H |
| H | H | ↓ | H | H | $\overline{Qo}$ | Qo |

| | | | |
|---|---|---|---|
| | 1 | 14 | Vcc |
| CLR | 2 | 13 | PR |
| j1 | 3 | 12 | CK |
| j2 | 4 | 11 | K3 |
| j3 | 5 | 10 | K2 |
| $\overline{Q}$ | 6 | 9 | K1 |
| GND | 7 | 8 | Q |

j = j1.j2.j3

R = R1.R2.R3

## 7473 DUAL j-K MASTER-SLAVE FLIP-FLOPS WITH CLEAR

**Vcc = 5V DOUA BISTABILE j-K/M-S**

| TIP 74 | TACT | FREC MHz | P/F-F mW | $t_{SETUP}$ ns | $t_{HOLD}$ ns | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| 73 | H-L | 20 | 50 | 0↑ | 0↓ | 20 | 16 | 25 |
| H73 | H-L | 30 | 80 | 0↑ | 0↓ | 18 | 14 | 22 |
| L73 | H-L | 3 | 3,8 | 0↑ | 0↓ | 42 | 35 | 60 |
| LS73A | H-L | 45 | 20 | 20↓ | 0↓ | 15 | 15 | 15 |

| | | | |
|---|---|---|---|
| 1CK | 1 | 14 | 1j |
| 1CLR | 2 | 13 | 1$\overline{Q}$ |
| 1K | 3 | 12 | 1Q |
| Vcc | 4 | 11 | GND |
| 2CK | 3 | 10 | 2K |
| 2CLR | 2 | 9 | 2Q |
| 2j | 1 | 8 | 2$\overline{Q}$ |

| INPUTS 73,H73,L73 | | | | OUTPUTS | |
|---|---|---|---|---|---|
| CLEAR | CLOCK | j | k | Q | $\overline{Q}$ |
| L | X | X | X | L | H |
| H | ↓ | L | L | Qo | $\overline{Qo}$ |
| H | ↓ | H | L | H | L |
| H | ↓ | L | H | L | H |
| H | ↓ | H | H | $\overline{Qo}$ | Qo |

| INPUTS LS73A | | | | OUTPUTS | |
|---|---|---|---|---|---|
| CLR | CLCK | j | k | Q | $\overline{Q}$ |
| L | X | X | X | L | H |
| H | ↓ | L | L | Qo | $\overline{Qo}$ |
| H | ↓ | H | L | H | L |
| H | ↓ | L | H | L | H |
| H | ↓ | H | H | $\overline{Qo}$ | Qo |
| H | H | X | X | Qo | $\overline{Qo}$ |

**7474** DUAL TIPE POSITIVE-EDGE-TRIGGERED FLIP-FLOPS WITH PRESET AND CLEAR

Vcc = 5V DOUA BISTABILE DE TIP D

| TIP 74 | TACT | FREC MHz | P mW | tSEUP ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| 74 | L-H | 25 | 43 | 20↑ | 5↑ | 17 | 14 | 20 |
| H74 | L-H | 43 | 75 | 15↑ | 5↑ | 11 | 8,5 | 13 |
| L74 | L-H | 3 | 4 | 50↑ | 15↑ | 65 | 65 | 65 |
| LS74A | L-H | 33 | 10 | 25↑ | 5↑ | 19 | 13 | 25 |
| S74 | L-H | 110 | 75 | 3↑ | 2↑ | 6 | 6 | 6 |
| ALS74 | L-H | 50 | 12 | 15↑ | 0↑ | 10 | 8 | 12 |

| | | | |
|---|---|---|---|
| 1CLR | 1 | 14 | Vcc |
| 1D | 2 | 13 | 2CLR |
| 1CK | 3 | 12 | 2D |
| 1PR | 4 | 11 | 2CK |
| 1Q | 5 | 10 | 2PR |
| $\overline{1Q}$ | 6 | 9 | 2Q |
| GND | 7 | 8 | $\overline{2Q}$ |

| INPUTS 74 | | | | OUTPUTS | |
|---|---|---|---|---|---|
| PRESET | CLEAR | CLOCK | D | Q | $\overline{Q}$ |
| L | H | X | X | H | L |
| H | L | X | X | L | H |
| L | L | X | X | H* | H* |
| H | H | ↑ | H | H | L |
| H | H | ↑ | L | L | H |
| H | H | L | X | Qo | $\overline{Qo}$ |

| INPUT 75 | | OUTPUT | |
|---|---|---|---|
| D | E | Q | $\overline{Q}$ |
| L | H | L | H |
| H | H | H | L |
| X | L | Qo | $\overline{Qo}$ |

**7475** 4-BIT BISTABILE LATCHES

Vcc = 5V 4 BISTABILE D CU RETINERE

| TIP 74 | ENAB | FREC MHz | P mW | tSET ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| 75 | H | 25 | 160 | 20 | 5 | 15 | 16 | 14 |
| L75 | H | 3 | 80 | 40 | 10 | 30 | 32 | 28 |
| LS75 | H | 33 | 32 | 20 | 5 | 12 | 15 | 9 |

| | | | |
|---|---|---|---|
| $\overline{1Q}$ | 1 | 16 | 1Q |
| 1D | 2 | 15 | 2Q |
| 2D | 3 | 14 | $\overline{2Q}$ |
| ENABLE 3-4 | 4 | 13 | ENABLE 1-2 |
| Vcc | 5 | 12 | GND |
| 3D | 6 | 11 | $\overline{3Q}$ |
| 4D | 7 | 10 | 3Q |
| $\overline{4Q}$ | 8 | 9 | 4Q |

**7476** DUAL j-k FLIP-FLOPS WITH PRESET AND CLEAR

Vcc = 5V 2 BISTABILE j-k

| TIP 74 | TACT | FREC MHz | P mW | tSEUP ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| 76 | H-L | 20 | 50 | 0↑ | 0↑ | 22 | 16 | 25 |
| H76 | H-L | 30 | 80 | 0↑ | 0↑ | 18 | 14 | 22 |
| LS76A | H-L | 45 | 10 | 20↓ | 0↑ | 15 | 15 | 15 |

| | | | |
|---|---|---|---|
| 1CK | 1 | 16 | 1K |
| 1PR | 2 | 15 | 1Q |
| 1CLR | 3 | 14 | $\overline{1Q}$ |
| 1j | 4 | 13 | GND |
| Vcc | 5 | 12 | 2K |
| 2CK | 6 | 11 | 2Q |
| 2PR | 7 | 10 | $\overline{2Q}$ |
| 2CLR | 8 | 9 | 2j |

TABELUL DE STARI IDENTIC 7472

**7477** **4-BIT BISTABILE LATCHES**

**Vcc = 5V** **PATRU BISTABILE D CU RETINERE**

| TIP 74 | TACT | FREC MHz | P mW | tSET ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| L77 | H | 3 | 80 | 40 | 10 | 30 | 32 | 28 |

| | | | |
|---|---|---|---|
| 1D | 1 | 14 | 1Q |
| 2D | 2 | 13 | 2Q |
| ENABLE 3-4 | 3 | 12 | ENABLE 1-2 |
| Vcc | 4 | 11 | GND |
| 3D | 5 | 10 | |
| 4D | 6 | 9 | 3Q |
| | 7 | 8 | 4Q |

**TABELUL DE STARI IDENTIC 7475**

**7478** **DUAL j-k FLIP-FLOPS WITH PRESET,COMMON CLEAR,COMMON CLOCK**

**Vcc = 5V** **DOUA BISTABILE j-k**

| TIP 74 | TACT | FREC MHz | P mW | tSEUP ns | tHOLD ns | tpd ns | tpLH ns | tpHL ns |
|---|---|---|---|---|---|---|---|---|
| H78 | H-L | 30 | 80 | 0↑ | 0↓ | 18 | 14 | 22 |
| L78 | H-L | 3 | 3,8 | 0↑ | 0↓ | 42 | 35 | 60 |
| LS78A | H-L | 45 | 20 | 20↓ | 0↓ | 15 | 15 | 15 |

| L78 LS78A | H78 | | | H78 | L78 LS78A |
|---|---|---|---|---|---|
| CK | 1K | 1 | 14 | Vcc | 1K |
| 1PR | 1Q | 2 | 13 | 1PR | 1Q |
| 1j | $1\overline{Q}$ | 3 | 12 | CLR | $1\overline{Q}$ |
| Vcc | 1j | 4 | 11 | 2j | GND |
| CLR | $2\overline{Q}$ | 5 | 10 | 2PR | 2j |
| 2PR | 2Q | 6 | 9 | CK | $2\overline{Q}$ |
| 2K | GND | 7 | 8 | 2K | 2Q |

**TABELUL DE STARI IDENTIC 7472**

**7480** **GATED FULL ADDERS**

**Vcc = 5V** **SUMATOR COMPLECT**

| TIP 74 | IOL mA | IOH mA | IIL mA | IIH µA | Pcc mW | tpd ns | tpLH ns | tpHL ns | ICC mA |
|---|---|---|---|---|---|---|---|---|---|
| 80 | 16/8 | 0,4/0,2 | 1,6 | 15 | 105 | 57 | 52 | 62 | 21 |

| | | | |
|---|---|---|---|
| B* | 1 | 14 | Vcc |
| Bc | 2 | 13 | B2 |
| $\overline{Cn}$ | 3 | 12 | B1 |
| $\overline{Cn+1}$ | 4 | 11 | Ac |
| S | 5 | 10 | A* |
| $\overline{S}$ | 6 | 9 | A2 |
| GND | 7 | 8 | A1 |

| INPUTS | | | OUTPUTS | | |
|---|---|---|---|---|---|
| Cn | B | A | $\overline{Cn+1}$ | $\overline{S}$ | S |
| L | L | L | H | H | L |
| L | L | H | H | L | H |
| L | H | L | H | L | H |
| L | H | H | L | H | L |
| H | L | L | H | L | H |
| H | L | H | L | H | L |
| H | H | L | L | H | L |
| H | H | H | L | L | H |

$$A = \overline{Ac} + \overline{A^*} + A1.A2$$

$$B = \overline{Bc} + \overline{B^*} + B1.B2$$

## 7481 16-BIT RANDOM ACCESS MEMORIES

Vcc = 5V MEMORIE DE 16-BITI CU ACCES DIRECT CU S IN GOL

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pHL}$ ns | $t_{pLH}$ ns | $t_{SR}$ ns |
|---|---|---|---|---|---|---|---|---|---|
| 81 | 40 | 250 | 1,6/ 11 | 40/ 400 | 225 | 12,5 | 12 | 13 | 13 |

X1-X4 W-INPUT

ADDRESS

Y1-Y4 S-OUTPUT

| | | | |
|---|---|---|---|
| X3 | 1 | 14 | X4 |
| X2 | 2 | 13 | WRITE 1 |
| X1 | 3 | 12 | SENSE 1 |
| Vcc | 4 | 11 | SENSE 0 |
| Y1 | 5 | 10 | GND |
| Y2 | 6 | 9 | WRITE 0 |
| Y3 | 7 | 8 | Y4 |

## 7482 2-BIT BINARY FULL ADDERS

Vcc = 5V SUMATOR COMPLECT PE 2 BITI

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| 82 | 16 | 0,4 | 1,6/6,4 | 40/160 | 175 | 37,5 | 40 | 35 |

| | | | |
|---|---|---|---|
| S1 | 1 | 14 | A2 |
| A1 | 2 | 13 | B2 |
| B1 | 3 | 12 | S2 |
| Vcc | 4 | 11 | GND |
| C0 | 5 | 10 | C2 |
| | 6 | 9 | |
| | 7 | | |

## 7483 4-BIT BINARY FULL ADDERS WITH FAST CARRY

Vcc = 5V SUMATOR BINAR PE 4 BITI CU TRANSPORT RAPID

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| 83 | 16 | 0,8 | 1,6 | 40 | 330 | 16 | 16 | 16 |
| LS83A | 8 | 0,4 | 0,8 | 40 | 95 | 15,5 | 16 | 15 |

| | | | |
|---|---|---|---|
| A4 | 1 | 16 | B4 |
| S3 | 2 | 15 | S4 |
| A3 | 3 | 14 | C4 |
| B3 | 4 | 13 | C0 |
| Vcc | 5 | 12 | GND |
| S2 | 6 | 11 | B1 |
| B2 | 7 | 10 | A1 |
| A2 | 8 | 9 | S1 |

## 7484 16-BIT RANDOM ACCESS MEMORIES

Vcc = 5V MEMORIE CU ACCES DIRECT PE 16 BITI

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ µA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $t_{SR}$ ns |
|---|---|---|---|---|---|---|---|---|---|
| 84 | 40 | 250 | 1,6/11 | 40/400 | 225 | 12,5 | 12 | 13 | 13 |

X1-X4 W1 = W1(A).W1(B)

ADDRESS

Y1-Y4 W0 = W0(A).W0(B)

W-INPUT

S-OUTPUT WITH OPEN COLLECTOR

| | | | |
|---|---|---|---|
| X4 | 1 | 16 | 1(A)WRITE |
| X3 | 2 | 15 | 1(B)WRITE |
| X2 | 3 | 14 | 1SENCE |
| X1 | 4 | 13 | 0SENCE |
| Vcc | 5 | 12 | GND |
| Y1 | 6 | 11 | 0(A)WRITE |
| Y2 | 7 | 10 | 0(B)WRITE |
| Y3 | 8 | 9 | Y4 |

**7485** **4-BIT MAGNITUDE COMPARATORS**

Vcc = 5V **COMPARATOR PE 4 BITI**

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| 85 | 16 | 0,4 | 1,6/4,8 | 40/160 | 275 | 21 | 23 | 20 |
| L85 | 3,6 | 0,2 | 0,18/0,54 | 10/30 | 16 | 82 | 90 | 75 |
| LS85 | 8 | 0,4 | 0,4/1,2 | 20/60 | 52 | 25 | 27 | 23 |
| S85 | 20 | 1 | 2/6 | 50/150 | 550 | 11 | 12 | 11' |

| | | | | |
|---|---|---|---|---|
| | B3 | 1 | 16 | Vcc |
| INPUTS | A<B | 2 | 15 | A3 |
| INPUTS | A=B | 3 | 14 | B2 |
| INPUTS | A>B | 4 | 13 | A2 |
| OUTS | A>B | 5 | 12 | A1 |
| OUTS | A=B | 6 | 11 | B1 |
| OUTS | A<B | 7 | 10 | A0 |
| | GND | 8 | 9 | B0 |

| WORD LENGTH | NR. OF PK. | 85 | L85 | LS85 | S85 |
|---|---|---|---|---|---|
| 1-4 BITS | 1 | 23 ns | 90 ns | 24 ns | 11 ns |
| 5-24 | 2-6 | 46 ns | 180ns | 48 ns | 22 ns |
| 25-120 | 8-31 | 69 ns | 270ns | 72 ns | 33 ns |

**7486** **QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES**

Vcc = 5V **PATRU PORTI SAU-EXCLUSIV CU 2 INTRARI**

$Y = A \oplus B$

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns | $P_{cc/p}$ mW |
|---|---|---|---|---|---|---|---|---|---|
| 86 | 16 | 0,8 | 1,6 | 40 | 150 | 14 | 16 | 12 | 38 |
| L86 | 3,6 | 0,2 | 0,36 | 20 | 19 | 55 | 62 | 47 | 4,75 |
| LS86 | 8 | 0,4 | 0,8 | 40 | 30,5 | 14 | 16 | 12 | 7,6 |
| S86 | 20 | 1 | 2 | 50 | 250 | 7 | 7 | 6,5 | 63 |

| | | | |
|---|---|---|---|
| 1A | 1 | 14 | Vcc |
| 1B | 2 | 13 | 4B |
| 1Y | 3 | 12 | 4A |
| 2A | 4 | 11 | 4Y |
| 2B | 5 | 10 | 3B |
| 2Y | 6 | 9 | 3A |
| GND | 7 | 8 | 3Y |

**7487** **4-BIT TRUE/COMPLEMENT,ZERO/ONE ELEMENTS**

Vcc = 5V

| TIP 74 | $I_{OL}$ mA | $I_{OH}$ mA | $I_{iL}$ mA | $I_{iH}$ µA | $P_{cc}$ mW | $t_{pd}$ ns | $t_{pLH}$ ns | $t_{pHL}$ ns |
|---|---|---|---|---|---|---|---|---|
| H87 | 20 | 1 | 2 | 50 | 270 | 17 | 17 | 17 |

| | | | |
|---|---|---|---|
| C | 1 | 14 | Vcc |
| A1 | 2 | 13 | A4 |
| Y1 | 3 | 12 | Y4 |
| | 4 | 11 | |
| A2 | 5 | 10 | A3 |
| Y2 | 6 | 9 | Y3 |
| GND | 7 | 8 | B |

| CONTROL INPUTS | | OUTPUTS | | | |
|---|---|---|---|---|---|
| B | C | Y1 | Y2 | Y3 | Y4 |
| L | L | $\overline{A1}$ | $\overline{A2}$ | $\overline{A3}$ | $\overline{A4}$ |
| L | H | A1 | A2 | A3 | A4 |
| H | L | H | H | H | H |
| H | H | L | L | L | L |

**7488** **256-BIT READ-ONLY MEMORIES (ROM)**

Vcc = 5V 32 x 8 BIT WORDS OPEN COLLECTOR OUTPUTS

7488

| | | | |
|---|---|---|---|
| D01 | 1 | 16 | Vcc |
| D02 | 2 | 15 | CS |
| D03 | 3 | 14 | ADE |
| D04 | 4 | 13 | ADD |
| D05 | 5 | 12 | ADC |
| D06 | 6 | 11 | ADB |
| D07 | 7 | 10 | ADA |
| GND | 8 | 9 | D08 |

7489

| | | | |
|---|---|---|---|
| ADA | 1 | 16 | Vcc |
| ME | 2 | 15 | ADB |
| WE | 3 | 14 | ADC |
| DI1 | 4 | 13 | ADD |
| D01 | 5 | 12 | DI4 |
| DI2 | 6 | 11 | D04 |
| D02 | 7 | 10 | DI3 |
| GND | 8 | 9 | D03 |

**7489** **64-BIT READ/WRITE MEMORIES**

Vcc = 5V 16 x 4 BIT WORDS

**7490** **DECADE COUNTER**

Vcc = 5V DIVIDE-BY-TWO AND DIVIDE-BY-FIVE

NUMARATOR DECADIC (DIVIZOR DE 2 SI 5)

**7491** **8-BIT SHIFT REGISTERS**

Vcc = 5V REGISTRU DE DEPLASARE PE 8 BITI

| TIP 74 | TACT | FREC MHz | tpH ns | tpLH ns | Pcc ns |
|---|---|---|---|---|---|
| 91A | L-H | 18 | 24 | 27 | 175 |
| L91 | L-H | 6,5 | 55 | 100 | 17,5 |
| LS91 | L-H | 18 | 24 | 27 | 60 |

| INPUTS ATtn | | OUTPUTS ATtn+8 | |
|---|---|---|---|
| A | B | QH | $\overline{QH}$ |
| H | H | H | L |
| L | X | L | H |
| X | L | L | H |

| | | | |
|---|---|---|---|
| | 1 | 14 | $\overline{QH}$ |
| | 2 | 13 | QH |
| | 3 | 12 | INPUT A |
| | 4 | 11 | INPUT B |
| Vcc | 5 | 10 | GND |
| | 6 | 9 | CLOCK |
| | 7 | 8 | |

**7492** **DIVIDE-BY-TWELVE COUNTERS**

NUMARATOR DIVIZOR PRIN 12

**7493** **4-BIT BINARY COUNTERS**

Vcc = 5V NUMARATOR BINAR DE 4 BITI

90A / L90 / LS90

| | | | |
|---|---|---|---|
| INTB | 1 | 14 | INTA |
| R0(1) | 2 | 13 | |
| R0(2) | 3 | 12 | QA |
| | 4 | 11 | QD |
| Vcc | 5 | 10 | GND |
| R9(1) | 6 | 9 | QB |
| R9(2) | 7 | 8 | QC |

92A / LS92

| | | | |
|---|---|---|---|
| INTB | 1 | 14 | INTA |
| | 2 | 13 | |
| | 3 | 12 | QA |
| | 4 | 11 | QB |
| Vcc | 5 | 10 | GND |
| R0(1) | 6 | 9 | QC |
| R0(2) | 7 | 8 | QD |

93A / LS93

| | | | |
|---|---|---|---|
| INTB | 1 | 14 | INTA |
| R0(1) | 2 | 13 | |
| R0(2) | 3 | 12 | QA |
| | 4 | 11 | QD |
| Vcc | 5 | 10 | GND |
| | 6 | 9 | QB |
| | 7 | 8 | QD |

L93

| | | | |
|---|---|---|---|
| R0(1) | 1 | 14 | INTA |
| R0(2) | 2 | 13 | QA |
| | 3 | 12 | QD |
| Vcc | 4 | 11 | GND |
| | 5 | 10 | QC |
| | 6 | 9 | QB |
| | 7 | 8 | INTB |

**90A,L90,LS90**

| NR. | OUTPUT | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | L | L | L | L |
| 1 | L | L | L | H |
| 2 | L | L | H | L |
| 3 | L | L | H | H |
| 4 | L | H | L | L |
| 5 | L | H | L | H |
| 6 | L | H | H | L |
| 7 | L | H | H | H |
| 8 | H | L | L | L |
| 9 | H | L | L | H |

QA conectat la int.B

**90A,L90,LS90**

| NR. | OUTPUT | | | |
|---|---|---|---|---|
| | QA | QD | QC | QB |
| 0 | L | L | L | L |
| 1 | L | L | L | H |
| 2 | L | L | H | L |
| 3 | L | L | H | H |
| 4 | L | H | L | L |
| 5 | H | L | L | L |
| 6 | H | L | L | H |
| 7 | H | L | H | L |
| 8 | H | L | H | H |
| 9 | H | H | L | L |

QD conectat la int.A

**92A,LS92**

| NR. | OUTPUT | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | L | L | L | L |
| 1 | L | L | L | H |
| 2 | L | L | H | L |
| 3 | L | L | H | H |
| 4 | L | H | L | L |
| 5 | L | H | L | H |
| 6 | H | L | L | L |
| 7 | H | L | L | H |
| 8 | H | L | H | L |
| 9 | H | L | H | H |
| 10 | H | H | L | L |
| 11 | H | H | L | H |

QA conectat la int.B

**93A,L93,LS93**

| NR | OUTPUT | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | L | L | L | L |
| 1 | L | L | L | H |
| 2 | L | L | H | L |
| 3 | L | L | H | H |
| 4 | L | H | L | L |
| 5 | L | H | L | H |
| 6 | L | H | H | L |
| 7 | L | H | H | H |
| 8 | H | L | L | L |
| 9 | H | L | L | H |
| 10 | H | L | H | L |
| 11 | H | L | H | H |
| 12 | H | H | L | L |
| 13 | H | H | L | H |
| 14 | H | H | H | L |
| 15 | H | H | H | H |

QA conectat la int B

| TIP 74 | TACT | FREC MHz | Pcc mW | IiL mA | IiH µA | tpLH ns | tpHL ns | tSETUP ns |
|---|---|---|---|---|---|---|---|---|
| 90A | H-L | 42 | 145 | 4,8 | 120 | 32 | 34 | 25 |
| L90 | H-L | 6 | 20 | 1,08 | 60 | 230 | 230 | |
| LS90 | H-L | 42 | 45 | 3,2 | 80 | 32 | 34 | 25 |
| 92A | H-L | 42 | 130 | 4,8 | 120 | 32 | 34 | 25 |
| LS92 | H-L | 42 | 45 | 3,2 | 80 | 32 | 34 | 25 |
| 93A | H-L | 42 | 130 | 3,2 | 80 | 46 | 46 | 25 |
| L93 | H-L | 6 | 16 | 0,36 | 20 | 280 | 280 | |
| LS93 | H-L | 42 | 45 | 2,4 | 80 | 46 | 46 | 25 |

**RESET/COUNT FUNCTION TABLE**
**90A,LS90,L90**

| RESET INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| R0(1) | R0(2) | R9(1) | R9(2) | QD | QC | QB | QA |
| H | H | L | X | L | L | L | L |
| H | H | X | L | L | L | L | L |
| X | X | H | H | H | L | L | H |
| X | L | X | L | COUNT | | | |
| L | X | L | X | COUNT | | | |
| L | X | X | L | COUNT | | | |
| X | L | L | X | COUNT | | | |

**RESET/COUNT FUNCTION TABLE**
**92A,LS92,93A,LS93,L93**

| RESET | | OUTPUTS | | | |
|---|---|---|---|---|---|
| R0(1) | R0(2) | QD | QC | QB | QA |
| H | H | L | L | L | L |
| L | X | COUNT | | | |
| X | L | COUNT | | | |

## 7494 4-BIT-SHIFT REGISTER/DUAL ASYNCHRONOUS PRESET

Vcc = 5V REGISTRU DE DEPLASARE PE 4 BITI CU DOUA INTRARI ASINCRONE DE PUNERE PE "1"

| PRESET | | | | INTERN | INTERN.PRESET | | | | INPUTS | | | INTERN OUT OUT. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE1 | P1i | PE2 | P2i | PRESET i | A | B | C | D | CLR | CLK | SER | QA | QB | QC | QD |
| L | X | L | X | H | H | H | H | H | H | X | X | L | L | L | L |
| L | X | X | L | H | L | L | L | L | L | X | X | H | H | H | H |
| X | L | L | X | H | H | H | H | H | L | L | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| X | L | X | L | H | L | H | L | H | L | L | X | H | $Q_{B0}$ | H | $Q_{D0}$ |
| H | H | X | X | L(act.) | H | H | H | H | L | ↑ | H | H | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ |
| X | X | H | H | L(act.) | H | H | H | H | L | ↑ | L | L | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ |

P1i = int.P1A,P1B,P1C,P1D $Q_{A0}$,$Q_{B0}$,$Q_{C0}$,$Q_{D0}$ - nivel QA,QB,QC,QD inainte CLOCK

P2i = int.P2A,P2B,P2C,P2D QAn,QBn,QCn,QDn - nivel QA,QB,QC,QD dupa CLOCK

i = internal A,B,C,D

| | | | |
|---|---|---|---|
| P1A | 1 | 16 | P2A |
| P1B | 2 | 15 | PE2 |
| P1C | 3 | 14 | P2B |
| P1D | 4 | 13 | P2C |
| Vcc | 5 | 12 | GND |
| PE1 | 6 | 11 | P2D |
| SER.IN. | 7 | 10 | CLEAR |
| CLOCK | 8 | 9 | OUT. |

**REG. DE DEPLASARE DE TIP INTRARE SERIE-IESIRE SERIE**

**INTRARE PARALELA-IESIRE SERIE**

| TIP 74 | FREC MHz | Pcc mW | IiH uA | IiL mA | $t_{pLH}$ ns | $t_{pHL}$ ns | $t_{SETUP}$ ns |
|---|---|---|---|---|---|---|---|
| 94 | 10 | 175 | 160 | 6,4 | 25 | 25 | 35 |

## 7495 4-BIT PARALLEL-ACCESS SHIFT REGISTERS

**REGISTRU DE DEPLASARE PE 4 BITI CU ACCES PARALEL**

| TIP 74 | FREC MHz | Pcc mW | $I_{iH}$ ua | $I_{iL}$ ma | $t_{pLH}$ ns | $t_{pHL}$ ns | tSU ns | $t_{hold}$ ns |
|---|---|---|---|---|---|---|---|---|
| 95A | 36 | 195 | 80 | 3,2 | 18 | 21 | 15 | 0 |
| L95 | 5 | 19 | 20 | 0,36 | 115 | 125 | 100 | 120 |
| LS95A | 36 | 65 | 20 | 0,4 | 18 | 21 | 20 | 10 |

| INPUTS | | | | | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MODE CNTRL | CLOCKS 2(L) | 1(R) | SER | PARALLEL A | B | C | D | QA | QB | QC | QD |
| H | H | X | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| H | ↓ | X | X | a | b | c | d | a | b | c | d |
| H | ↓ | X | X | $Q_B$↑ | $Q_C$↑ | $Q_d$↑ | d | $Q_{Bn}$ | $Q_{Cn}$ | $Q_{Dn}$ | d |
| L | L | H | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| L | X | ↓ | H | X | X | X | X | H | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ |
| L | X | ↓ | L | X | X | X | X | L | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ |
| ↑ | L | L | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| ↓ | L | L | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| ↓ | L | H | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| ↑ | H | L | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |
| ↑ | H | H | X | X | X | X | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ |

| | | | |
|---|---|---|---|
| SER | 1 | 14 | Vcc |
| A | 2 | 13 | QA |
| B | 3 | 12 | QB |
| C | 4 | 11 | QC |
| D | 5 | 10 | QD |
| MODE | 6 | 9 | CLCK R |
| GND | 7 | 8 | CLCK L |

input

## 7496 5-BIT SHIFT REGISTERS
## REGISTRU DE DEPLASARE PE 5 BITI

| TIP 74 | FREC MHz | Pcc mw | $I_{iH}$ µA | $I_{iL}$ mA | $t_{pLH}$ ns | $t_{pHL}$ ns | tSU ns |
|---|---|---|---|---|---|---|---|
| 96 | 10 | 240 | 200 | 8 | 25 | 25 | 30 |
| L96 | 5 | 120 | 100 | 4 | 50 | 50 | 100 |
| LS96 | 25 | 60 | 100 | 2 | 25 | 25 | 30 |

| Pin | | Pin | |
|---|---|---|---|
| CLOCK | 1 | 16 | CLEAR |
| A | 2 | 15 | $Q_A$ |
| B | 3 | 14 | $Q_B$ |
| C | 4 | 13 | $Q_C$ |
| Vcc | 5 | 12 | GND |
| D | 6 | 11 | $Q_D$ |
| E | 7 | 10 | $Q_E$ |
| PRESET ENABLE | 8 | 9 | SERIAL IN |

| INPUT | | | | | | | | | OUTPUT | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLR | EN | PRESET A | B | C | D | E | CLK | SER | QA | QB | QC | QD | QE |
| L | L | X | X | X | X | X | X | X | L | L | L | L | L |
| L | X | L | L | L | L | L | X | X | L | L | L | L | L |
| H | H | H | H | H | H | H | X | X | H | H | H | H | H |
| H | H | L | L | L | L | L | L | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ | $Q_{E0}$ |
| H | H | H | L | H | L | H | L | X | H | $Q_{B0}$ | H | $Q_{D0}$ | H |
| H | L | X | X | X | X | X | L | X | $Q_{A0}$ | $Q_{B0}$ | $Q_{C0}$ | $Q_{D0}$ | $Q_{E0}$ |
| H | L | X | X | X | X | X | — | H | H | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ | $Q_{Dn}$ |
| H | L | X | X | X | X | X | — | L | L | $Q_{An}$ | $Q_{Bn}$ | $Q_{Cn}$ | $Q_{Dn}$ |

## SYNCRONOUS 6-BIT BINARY RATE MULTIPLIERS
## NUMARATOR PROGRAMABIL PE 6 BITI

| TIP 74 | FREC MHz | Pcc mw | $I_{iH}$ µA | $I_{iL}$ mA | tSU ns | $t_h$ ns |
|---|---|---|---|---|---|---|
| 97 | 32 | 345 | 80 | 3,2 | 25 | 20 |

| Pin | | Pin | |
|---|---|---|---|
| B | 1 | 16 | Vcc |
| E | 2 | 15 | D |
| F | 3 | 14 | C |
| A | 4 | 13 | CLR |
| Z | 5 | 12 | CASC. |
| Y | 6 | 11 | ENABLE IN |
| ENABLE OUT. | 7 | 10 | STROBE |
| GND | 8 | 9 | CLOCK |

$$f_{out} = \frac{M.f_{in}(CLOCK)}{64}$$

unde : $M = F.2^5 + E.2^4 + D.2^3 + C.2^2 + B.2^1 + A.2^0$

| INPUTS | | | | | | | | | | | | OUTPUTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLR | EN IN | STB | BINARY RATE F | E | D | C | B | A | NR CLK | CAS | NR. PULSES Y | Z | EN OUT |
| H | X | H | X | X | X | X | X | X | X | H | L | H | H |
| L | L | L | L | L | L | L | L | L | 64 | H | L | H | 1 |
| L | L | L | L | L | L | L | L | H | 64 | H | 1 | 1 | 1 |
| L | L | L | L | L | L | L | H | L | 64 | H | 2 | 2 | 1 |
| L | L | L | L | L | L | H | L | L | 64 | H | 4 | 4 | 1 |
| L | L | L | L | L | H | L | L | L | 64 | H | 8 | 8 | 1 |
| L | L | L | L | H | L | L | L | L | 64 | H | 16 | 16 | 1 |
| L | L | L | H | L | L | L | L | L | 64 | H | 32 | 32 | 1 |
| L | L | L | H | H | H | H | H | H | 64 | H | 63 | 63 | 1 |
| L | L | L | H | H | H | H | H | H | 64 | L | H | 63 | 1 |
| L | L | L | H | L | H | L | L | L | 64 | H | 40 | 40 | 1 |

## INDEX NUMERIC

Dl/D-na/Dra/ (Numele) ( Prenumele)
Adresa tel.
Localitatea Codul judetul
Reprezentant(a) al firmei (daca este cazul)
Solicit un numar de reviste din seria
nr.
Plata se va face in numerar prin virament
din contul nr. deschis la

Semnatura,
Stampila firmei

In seria SOFTWARE vor mai apare:
- Memento MSDOS
- Memento FORTRAN 77 (PC)
- Memento COBOL (PC)

*Dupa epuizarea tirajului, se vor onora comenzile prioritar in ordinea sosirii numai in cazul reeditarii.
* Asiguram expedierea la domiciliu contra taxelor postale in vigoare

**In seria HARDWARE vor mai apare :**

- **Arhitecturi sistolice de calculatoare**
- **catalog de circuite logice integrate (continuare)**


AS COMPUTER R.M.S.
1900 Timisoara
Str. Gh. Lazar Nr. 30-32 Ap. 1

tel. 961/24117




Se primesc de asemenea comenzi ferme pentru produsele si serviciile firmei

50 lei